

Design Constraint Conceptual Model

Outline: July 6, 1998

By: Jin-sheng Shyr

I About This Document

/* A overview description of the document */

I.1 **Purpose** /* purpose of the model */

The attempt of this document is to provide a Design Constraint Conceptual Model that:

- ◆ visualize the essentials that capture the **designer's intent**
- ◆ analyze the ways constraints are prescribed
- ◆ explore an information model to categorize constraints
- ◆ consolidate a common framework of working concepts

The model does not mean to:

- ◆ suggest the specific mechanisms to capture or transform design constraints
- ◆ purpose schema for a repository database

I.2 **Scope**

/* The scope of the model */

I.3 **Reference**

- | | |
|-----|---------------|
| [1] | Any reference |
| [2] | |

I.4 **Revision History**

Rev.	0.1	July 6, 1998	draft outline
------	-----	--------------	---------------

II Overview

/* Provide an analysis on the nature of design intents and their relationship with design constraints */

II.1 **Design Intents**

- ◆ Why is it important to capture and preserve design intents?
- ◆ The nature of design intents
- ◆ How the design constraints can be structured to reflect design intents?
- ◆ Programmatic aspects

II.2 Constraint Domains

II.3 Constraint Abstract Models

- ◆ How the constraints are prescribed – **Prescription Model**
- ◆ How are the constraints transformed along with transition in level of design abstraction – **Transformation Model** – incorporating Enrico's material
- ◆ How are the constraints applied to design hierarchy – **Hierarchy Model**
- ◆ How are the constraint data organized – **Information Model**
 - ◆ Syntactical rules
 - ◆ Semantic rules
 - ◆ File organization

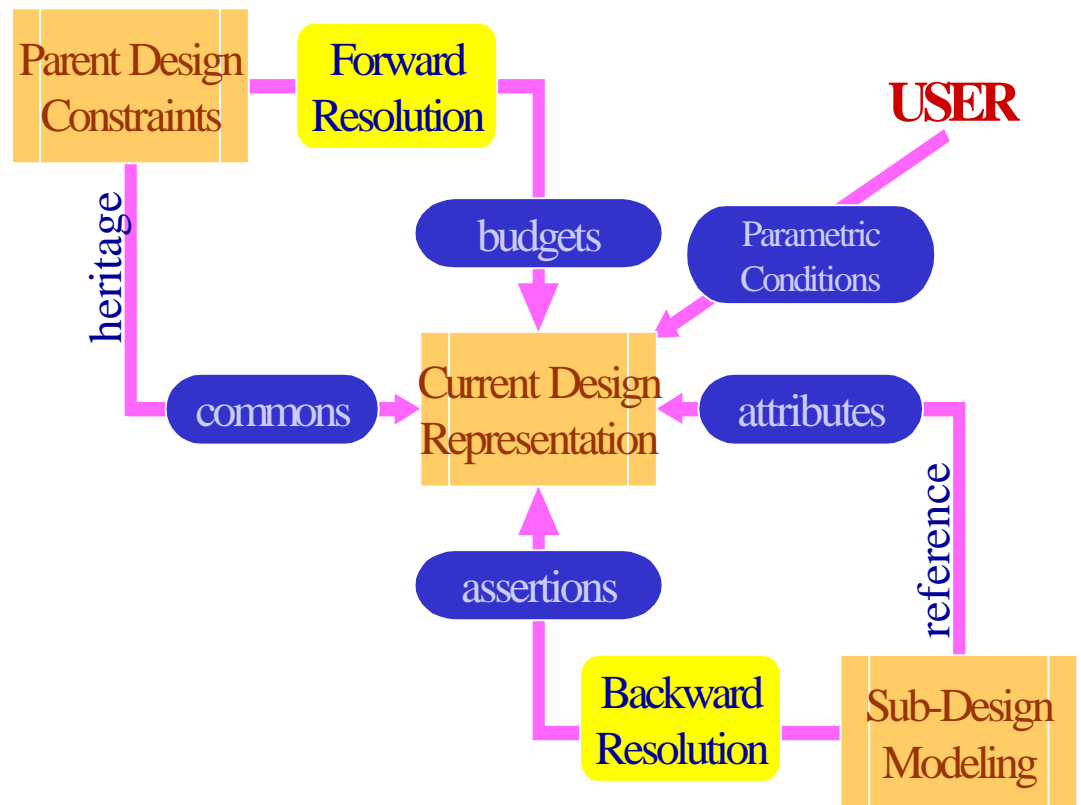
II.4 Methodology Implications

/* How these models fit in with Taxonomy, Language, Tools, EDA environments, etc. */

III Prescription Model

- ◆ **Commons:** Rules, Constants and Variable Assignments inherited from parent design
 - ◆ Technology Constants and Rules
 - ◆ Operating Conditions
 - ◆ Global Signals definition
- ◆ **Budgets:** forward constraint resolution -- propagated downward from parent design
 - ◆ Timing, Area, and Power Budgets
 - ◆ Floorplan and Wiring Models
- ◆ **Assertions:** backward constraint resolution -- surfaced upward from child designs
 - ◆ Clocking: skew, setup, hold, etc.
 - ◆ Local partial clocktree and power rings
 - ◆ Input arrival times, output required times, etc.
 - ◆ Signal Integrity Criteria
- ◆ **Attributes:** port level conditions extracted from or assumed for sub-module design implementation
 - ◆ Physical: location, orientation, shape and blockage
 - ◆ Estimated Wire Load Model
 - ◆ Design for Test
 - ◆ Port level Parasitic Conditioning
- ◆ **Parametric Conditions (Constriction?):**
 - ◆ Architecture/Logic Variables
 - ◆ Boundary Conditions

- ◆ Special Conditions
- ◆ Don't care conditions



- ◆ Mutually exclusive conditions
- ◆ Infeasible states (false paths, feedback loops)
- ◆ Detailed Implementation Controls
- ◆ File Pointers: parasitics, scripts, detailed wiring, etc.

- Toshiba proprietary format for cell library characterization data

IV Transformation Model

IV.1 Transition in design level of abstraction



V Hierarchy Model

VI Information Model

VII Future Works